DOCUMENT RESUME

ED 029 590 HE 000 800

Program/Project Management of Sponsored Programs in a University Environment.
Ohio State Univ., Columbus. Research Foundation.
Spons Agency-Office of Education (DHEW), Washington, D.C.
Pub Date 18 Sep 68
Note-15p.; Paper presented as part of the Management Training Program for Educational Research Leaders, Columbus, Ohio, September 18, 1968
EDRS Price MF-$0.25 HC-$0.85
Descriptors-*Administrative Principles, Educational Planning, Higher Education, *Institutional Environment, *Management, *Program Administration, *Research Projects, Systems Development

Management is a future-oriented decision process that relates resources into a total functional system for the accomplishment of a set of objectives. As a rule, universities do not have a management system, and there is no understanding of their environments in terms of the inputs, outputs, objectives, and organizational relationships of line and staff necessary for such a system. Hence, many of the problems of project management in the university arise from the lack of integrated planning, programming, and budgeting, and from an operational structure which does not encourage effective collection, distribution, and control over resources. Sponsored projects and programs involve a special set of relationships between the university, the faculty, and the sponsoring agency. These relationships create a unique sector of the university environment in which the individual faculty member is responsible for "selling" his program to a sponsor, and the university is responsible for assuring compliance on the part of the faculty member. The requirements of project management, the needs of a university management system, and the special demands placed on these 2 systems by an outside sponsor call for a separate administrative sub-system geared to meet the specific demands of sponsored programs. Such a system would ensure the proper monitoring of the commitment of university resources and the preservation of the priorities and goals of the operating structure of the university. (WM)

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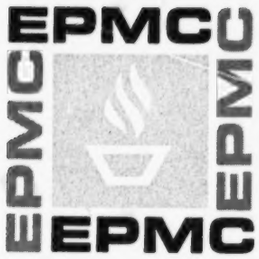

PROGRAM/PROJECT MANAGEMENT OF SPONSORED PROGRAMS IN A UNIVERSITY ENVIRONMENT

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A Paper Presented as part of the Management Training Program for Educational Research Leaders .

September 18, 1968

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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INTRODUCTION

In deliberating about what particular contribution I could make to this training program, and knowing both the breadth and detail of research management and administration considerations which Dr. Cook and his staff would cover during your program, it became apparent to me that my own talk should be contextual. In trying to determine what would be the most useful contextual factors to bring to your attention, three focal points immediately came to mind. Perhaps a brief discussion of my decision process and some points about my own background and interests might be the most beneficial introduction.

Let us look briefly at some changes in the environment which I consider to be particularly salient. It seems to me that two major factors characterize our environment. First, there has been since the end of World War II an explosion of knowledge in the quantity of information which has been generated, in the complexity of relationships between information which are now perceived if not fully understood, and in the scope and breadth of that explosion which covers almost all areas of human inquiry. Secondly, there has been an explosive growth of the public sector since the end of World War II in terms of the quantity of included activities, the breadth of the included areas, and the complexity and interdependence of problems and activities.

These two factors have led to what I would call a knowledge-dependent society and to a revolutionary pace of change which have brought about or at least made a significant contribution to the following trends:

1. A great movement of scientists, technologists, and academics into the Federal government.

2. Large sponsorship and utilization of research by the Federal government.

3. An increase in what is now called "Creative Federalism" or at least toward a spread of #1 and #2 above into state and local government.

4. Education has become the nation's largest business with huge demands on its resources and very little recognition of the fiscal requirements to respond to those demands.

5. Administrative environments have developed which are conducive or at least dedicated to change and demand people geared for and dedicated to change.

6. The primary demand on management has changed from one of handling people to include the management of information as well.

7. The development of a number of new planning, decision, and management tools and techniques which are spreading throughout the Federal government, to state and local government, and even to universities. This complex of tools and techniques includes such activities as systems analysis, cost/effectiveness or cost/benefit analysis, Planning Programming and Budgeting Systems, PERT, and CPM, and such concepts as systems management, program/project management, management information systems, etc. It is important, I think, to note that while there are great differences in the specific details of these tools and decision aids, there is a general logic and rationale underlying all of them.

What is clear is that a whole complex of related questions and problems arises out of these recent changes. Perhaps a brief look at my own background may indicate why three particular topics out of this complex occurred to me. First, I have had eight years of intensive experience of research program planning, management, and administration. During that period, I have been

involved in project management in a university environment, in program management in the government where we conducted an integrated research program which was carried out at 21 universities and 5 private research organizations, and in university research administration with the responsibility for providing a support system for sponsored research projects.

Secondly, I have been a student of and participant in Department of Defense management under Mr. MacNamara while at the same time my professional interests as a political scientist were focused on management and decision-making in defense policy, with particular emphasis on decision tools such as systems analysis, PPBS, and PERT. Finally, I have been quite concerned about the planning, managerial, and administrative aspects of public policy-making and problem solving, and particularly of late, about university planning and operations as they relate to the role of the university as a public resource.

Therefore, when I look at this whole complex of questions and problems and then consider this specific audience, namely, an audience of Educational Research Leaders, I see three broad areas of the "big picture" which are or should be important to such a group. For they are problems which in one way or another will affect your responsibilities whether those responsibilities be planning and decision responsibilities for educational systems, or program/project management responsibilities for specific research or training programs. These three broad areas are:

1. The meaning and implications of Federal sponsorship of research for universities, and here I refer to such questions as academic and institutional freedom, administrative and managerial requirements, the impact on the quality of instruction and research, and the impact on priorities in instruction and research.

2. The essential ingredients and their interrelationships which underlie the whole new array of analytic and management concepts and techniques, their inherent virtues and limitations, and some limitations and problems in the use of these techniques which stem from the decision process, the nature of the problem to which these tools are applied, or to some combination of both.

3. Program/project management in a university environment with particular attention to the problems for and the demands on the university as well as to the problems of the program/project manager in such an environment. The particular focus here would be on programs and projects sponsored by outside agencies.

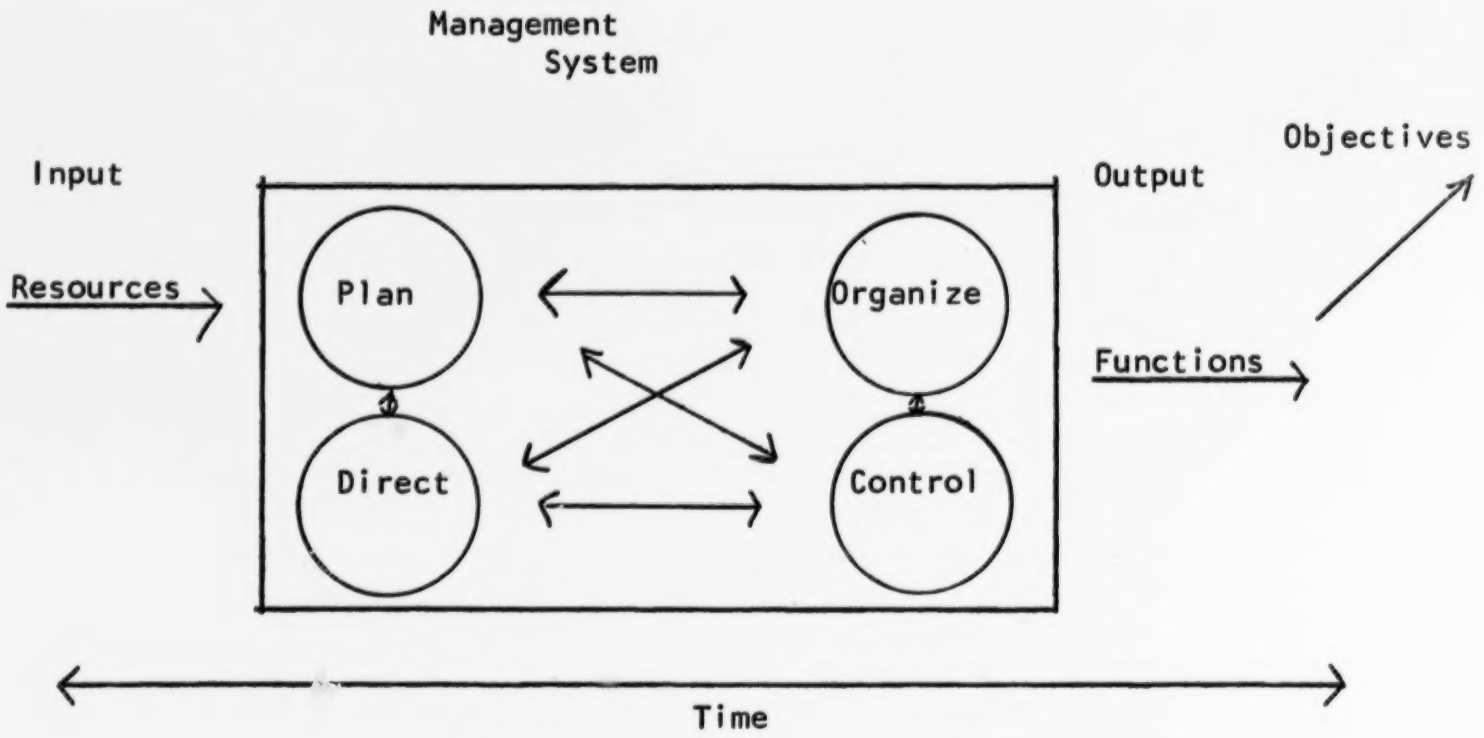
I have chosen this latter topic for several reasons. First, because it is a practical problem with which you as either a project manager or an educational administrator will have to deal. Part of the responsibility of planning and managing an operational program includes relating the goals, activities and performance of the program to the goals, activities and performance of the various levels of organization within which you will operate. While the philosophy or epistemology of the new analytical and management concepts and techniques and an awareness of their advantages and disadvantages is extraordinarily important, I feel for this group at this time it is too esoteric a topic.

However, I have also chosen the third topic, because really it cannot be intelligently discussed without discussing the other two questions. I can talk about the Federal impact on university research, and I can speak about the essential ingredients of the new planning tools without discussing particular problems in program/project management in the university environment. The contrary is not true, and because I feel that it is important at least to draw all three areas to your attention, and specifically to at least allude to some of these new tools and techniques, I have chosen the latter topic as an entree.

PROJECT MANAGEMENT

I am sure that your program has devoted time, and will devote more time, to basic management systems concepts, particularly as they apply to project management. But let me give you my particular perspective of project management. Management is simply a decision process which relates resources into a total functional system for the accomplishment of a set of objectives. I say a decision process, not a conceptual process, to differentiate the whole process of management from one essential element of management, namely, planning; for management implies action, implementation. As such, management is also future oriented, and hence, management is always dealing with uncertainty, reducing it, hedging against it, but always deciding and acting in an uncertain environment.

The key functions of management are planning, organizing, directing, controlling, but the key variables are inputs, outputs, objectives, and time, and these variables are present in all management functions.



Project management, I believe, is characterized by two things: (1) the nature of the objective which is highly specialized in terms of product, and/or performance level, which is terminal and non-repetitive, although it may be repeated, and which is highly constrained in terms of time and money; and (2) the nature of the environment, namely, that project management is a sub-system. It is part of an overall operational and management system which has larger and more inclusive objectives which may or may not be orthogonal to the project objectives. This latter point has three implications:

1. A key part of the project management task must be integration into the large management system, in terms of both the planning and the control functions of the larger system.

2. The effectiveness of the project is in large measure dependent upon the effectiveness of the larger management system, both in operational and in management information terms.

3. The degree of effectiveness of a project depends in large measure on the degree to which its objectives and activities can be integrated with the objectives and operational systems of the larger operational managerial units.

In short, project management implies a number of organizational environments which operate as a set of constraints on the function of the project management system.

THE UNIVERSITY ENVIRONMENT

Now let me turn to the university environment for a moment. Universities as a rule do not have a management system. They do not have effective means for coordination between administrators and operational people (primarily faculty). University resources are scarce and subject to episodic variation, and there is great need to plan and control the application of these resources to accomplish the objectives of the university. However, universities do not

have the communication vehicles for planning, program selection, and evaluation. They do not have operating structures for handling the collection, distribution, and control of resources on a functional or programmatic basis. Nor do they have the means for translating needs in terms of the operating structures. Finally, they do not as a ruie have an understanding of their environments in terms of the inputs, outputs, objectives, and the organizational relationships of line and staff necessary for management system. Hence, many of the problems of project management in the university arise from the lack of integrated planning, programming, and budgeting in the university, and from an operational structure which does not encourage the rational and effective collection, distribution and control over resources.

If one defines the university functionally and starts with the functions and sub-functions which directly serve the primary objectives of the university of augmenting and promulgating knowledge, such as instruction, research, development, creative work, and public services, one can bring not only to clarify the interrelationships between the functions and the sub-functions, for example, between graduate training and research, but can also begin to specify the exact services to be performed, the resources needed, and the criteria for evaluating the successful performance of any of these functions. One can also isolate the kinds of specific operational support services, such as library, and general administrative services necessary to perform effectively. Understanding the environment, then, helps to specify the managerial dimensions, that is, to organize around a function and to develop a line organization to handle the operations and a staff organization to provide support. One then can provide operating support systems to channel and control the line decisions which, if properly designed, will meet the management information needs for

planning and operational control. Further, one can begin to provide a program budgeting system which allows for the specification of program goals; selection of program priorities, activities, and performance levels; and then translate these into resource utilization plans. [Note that program budgeting is in fact very similar to a project proposal.] An integrated management system, particularly if the operational decisions are decentralized, is a basic requirement and the universities are moving toward it.

SPONSORED PROJECTS AND PROGRAMS

Sponsored projects and programs present another set of unique problems even to a university which has an integrated management system. These programs involve a special set of relationships between the university, the faculty, and the sponsoring agency which create a unique sector of the university environment. Although the importance of institutional support should not be discounted, the individual faculty member holds the key to success in the funding of most sponsored programs, for it is his capability, interest, motivation, and initiative that "sells" his program to a sponsor in a highly competitive environment. The faculty member generally is motivated by an opportunity to match his interest with sponsor interest. But, lacking control over sponsor interest and the interest of the individual faculty members, it is difficult to incorporate the exploitation of such opportunities into institutional planning.

Another unique feature of this sector of the university environment is that most sponsored programs represent a covenant between the faculty member and the sponsor, with the university accepting an institutional responsibility to assure compliance on the part of the faculty member. The protection of the

university environment against undue and unfavorable encroachment from sponsors requires continual and specialized administrative surveillance. Let me briefly list some of the characteristics of sponsored programs which contribute to the complexity of integrating such programs into the comprehensive university planning and program budgeting.

1. Most sponsored programs result from opportunities for program support that cannot be anticipated in program budget forecasts, whereas in a state university, at least, budget forecasts for state funds and student funds seem fairly reliable.

2. The development of sponsored projects is controlled by such factors as a definition of support program by the sponsor, faculty interest and motivation, competitive rank (quality) of proposal, availability of funds to sponsor, as well as the level of institutional support.

3. Many sponsored programs involve some degree of cost-sharing which may or may not have been anticipated in program budgeting; and individual faculty seeking support are often unaware of departmental program budgeting and restrictions on the allocations of university resources.

4. The sponsored program solicitation process introduces critical factors of uncertainty and complexity into the resource allocation process:

   a. the competitive nature of the gaining sponsored support increases the uncertainty as to the commitment of departmental resources;

   b. the 6-12 months decision time on the part of sponsors means institutional commitments must be held open on pending proposals;

   c. the starting and ending dates of sponsored programs so not coincide with the university budget year, thereby spreading reallocation decisions throughout the fiscal year.

5. In effect, each research project is a "small business" and major universities have to run 600-900 "small businesses," each with its own particular contractual requirements, including specific restrictions on budgets, personnel services, travel, purcahsing, and effort, technical, fiscal and audit reporting requirements.

6. Continuation of sponsored programs present the same set of problems as those listed above for the initiation of sponsored programs. In addition, planning for the continuation of sponsored programs requires management information on previous performance experience.

A SPECIAL ADMINISTRATIVE SUPPORT SUB-SYSTEM FOR SPONSORED PROGRAMS

It seems to me that the requirements on project management, the needs of an incipient university management system, and the special demands placed on the above two systems by the peculiarities of outside sponsorship, all call for a separate administrative sub-system geared to meet the particular demands of sponsored programs. Such a sub-system would have two sets of operational requirements, project services to project managers and administrative services to university management.

Project Services to Project Managers

The demands of conducting sponsored programs in a university environment generate the need for a whole range of services which can be catagorized around the two broad functions of gaining support for potential activities and carrying out the proposed responsibilities within the constraints of both the university and the sponsoring agency.

An administrative sub-system for sponsored programs would be expected to provide the following developmental services to aid in raising money for potential projects.

1. An information clearinghouse on potential sponsors - both government and private - including:

   Program and/or mission objectives

   Specific programs of support

   Analysis of patterns of awards

   Organization and personnel

   Administrative requirements

   Proposal submission format and content

   Other useful intelligence information

2. A source of program-planning counsel and assistance, particularly for interdisciplinary and multidisciplinary efforts.

3. Assistance in the preparation of proposal to sponsor and assistance in selecting the most appropriate sponsor(s).

4. Delegated institutional authority for negotiation of sponsored project grant or contract terms in best interests of both the project and the university.

Such a sub-system would also be expected to provide the following administrative and logistic services to aid project supervisors in implementing and sustaining sponsored project activities <u>with a minimum of administrative burden to dilute the professional efforts of the supervisors</u>:

1. Briefing of project supervisor as to pertinent sponsor regulations and requirements.

2. Adoption of administrative procedures which are designed to meet both university and sponsor requirements.

3. Assistance with purchases of project equipment, services and supplies in compliance with university and sponsor requirements.

4. Providing monthly statement of expenditures in a format designed to meet the fund management requirements.

5. Surveillance of performance requirements for sponsored projects as stipulated by sponsors.

6. Assistance in negotiation with sponsors relative to changes in project scope or budget.

7. Meeting of all institutional reporting and accountability requirements.

8. Special administrative assistance in times of unanticipated project emergencies.

9. Assistance in meeting technical reporting requirements.

10. Assistance in seeking funds for continuation of sponsored projects when appropriate and desirable.

Administrative Services to University Management

Sponsored programs create two sets of problems for the university management system, those concerned with the protection of the university from undue policy pressures and from burdensome operational requirements and those concerned with incorporating potential and actual programs into the resource planning and allocation system.

The following services are the minimal requirements of an administrative sub-system for sponsored programs:

1. To provide continuous and specialized administrative surveillance in order to obtain funds on terms favorable to the program and to the university, and to protect the university against undue and unfavorable encroachment from sponsors.

2. To coordinate all university contacts with Federal agencies and to have official representation of the university to those agencies on questions of agency policy which affect the university and its sponsored programs.

3. To preserve the integrity of the operating structure and system of the university against outside pressures and demands by serving as a buffer and special translator vis-a-vis programs sponsors.

4. To organize staff services to faculty, departments, and colleges in such a way as to provide management information to administration at all levels in a form which allows integration of such information into the planning and budgeting system of the university.

5. To organize all services and coordination in relation to the solicitation of funds in such a way as to insure centralized monitoring of the commitment of university resources.

6. To organize program development services and coordination in relation to sponsored program in such a way as to insure that actions taken are in accord with university goals and program priorities and with university policy and procedures for establishing goals and program priorities.

SUMMARY

Educational or research program management which involves planning, organizing, directing and controlling resources to perform the functions which accomplish the programs' objectives are difficult enough tasks in a hospitable environment. However, if such programs operate in an organizational environment which is not managed, that is, not planned, organized, directed, and controlled on the basis of functional programmatic categories, management of the program is severely constrained. A key task of any program manager is to integrate his program into the planning and control functions of the larger organization (department, college). This task becomes almost impossible if such functions are not performed in the larger organization on the basis of program management.

We have argued then for an integrated university management system which operates on a loosely defined program budgeting system. Program definition is an arbitrary process and the key principal to be followed in selecting program categories should be the necessity to highlight the key resource allocation decisions which must be made. If, then, one has a line organization whose components (e.g., colleges and departments) are organized and planned in terms of their programs, one can begin to design

both general and special support systems which cannot only provide the operational support to the program manager but can also serve to provide the information needed by the manager for further planning and operational control.

Because sponsored programs have to be managed within the constraints of two environments, those of the University and those of the sponsoring agencies, and because the University support systems should be designed to meet the standardized needs of the operational units, a separate sponsored program support system should be established. Such a support system would have two major operational advantages: (a) it would provide highly specialized support services organized to meet the needs of individual project managers; (b) it would protect the operating system (colleges, departments) and general support system of the University against outside pressures and would serve to translate information aggregated in ways beneficial to the operating system to outside agencies which need some of that information aggregated on entirely different bases.

In addition, such a specialized support system would provide for central university management a useful staff tool to insure the proper monitoring of the commitment of University resources and the preservation of the priorities and goals of the operating structure of the University. Given this general outline and argument, perhaps we now can use the question period to put flesh on these bare bones and handle some specific problems of how the organizational environment can help or hinder the success of program/project management.